



International Journal of Clinical and Health Psychology

www.elsevier.es/ijchp



ORIGINAL ARTICLE

Which occupational risk factors are associated with burnout in nursing? A meta-analytic study

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Received May 15, 2013; accepted September 9, 2013

KEYWORDS

Occupational factors;
Nursing;
Burnout;
Meta-analysis

Abstract Numerous empirical studies have suggested a link between occupational factors and the burnout syndrome. The effect sizes of the association reported vary widely in nursing professionals. The objective of this research was to assess the influence of five occupational factors (job seniority, professional experience, job satisfaction, specialization and work shift) on the three burnout dimensions (emotional exhaustion, depersonalization and personal accomplishment) in nursing. We conducted a meta-analysis with a total of 81 studies met to our inclusion criteria: 31 on job seniority; 29 on professional experience; 37 on job satisfaction; 4 on specialization; and 6 on work shift. The mean effect sizes found suggest that job satisfaction and, to a lesser extent, specialization were important factors influencing the burnout syndrome. The heterogeneity analysis showed that there was a great variability in all the estimates of the mean effect size. Various moderators were found to be significant in explaining the association between occupational factors and burnout. In conclusion, it is important to prevent the substantive moderators that are influencing these associations. The improved methodological variables explain most of the contradictory results found in previous research on this field.
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PALABRAS CLAVE

Factores
ocupacionales;
Enfermería;
Burnout;
Meta-análisis

Resumen Numerosos estudios sugieren la relación entre el síndrome de *burnout* y algunas variables ocupacionales e informan de diversos tamaños del efecto en sus asociaciones, en profesionales de Enfermería. El objetivo de este trabajo es estudiar la influencia de cinco variables ocupacionales (antigüedad en el puesto, antigüedad en la profesión, satisfacción laboral, especialización y turno laboral) y las tres dimensiones del síndrome (cansancio emocional, despersonalización y realización personal) en enfermeros. En este trabajo se realizó un meta-análisis de 81 estudios que cumplían los criterios de inclusión establecidos: 31 sobre antigüedad en el pue-

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to, 29 en experiencia profesional, 37 relacionados con satisfacción laboral, 4 con especialización y 6 con turno laboral. Los tamaños del efecto medio indican que la satisfacción laboral y, en menor medida, la especialización eran factores importantes que influye en el *burnout*. La heterogeneidad encontrada en las estimaciones de los tamaños del efecto hace necesario realizar el análisis de variables moderadoras, obteniéndose que algunos moderadores son de gran interés en la explicación de las asociaciones. En conclusión, sería importante prevenir las variables moderadoras sustantivas que median estas asociaciones. Los aspectos metodológicos deberían ser mejorados pues parecen explicar algunos de los resultados contradictorios que se encuentran en las investigaciones en este ámbito.

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The rising interest in the burnout syndrome is due to the fact that it is a condition that affects more and more people working in a wide variety of professions. Epidemiological data concerning this syndrome reflect the seriousness of the problem and the negative impact of its effects both at home and at work. This in itself explains why the quantity of burnout research has soared over the last forty years (Epp, 2012).

More specifically, the burnout syndrome is beginning to be regarded as an occupational illness of high prevalence among health professionals in Spain (Paris & Hoge, 2010; Prins et al., 2007). This disorder has serious repercussions on staff as well as on the institutions where they work. It also takes a toll on the users of medical facilities since health professionals suffering from burnout syndrome are unable to provide high-quality service (Ortega & López, 2004).

Burnout is generally conceived as having three dimensions: (i) emotional exhaustion (EE) refers to sensations of physical overexertion and mental weariness stemming from continuous interactions with other workers and clients; (ii) depersonalization (D) is the development of negative and cynical attitudes about one's clients; (iii) reduced personal accomplishment (PA) reflects the tendency to evaluate oneself negatively, particularly with regard to work with clients. Workers feel unhappy about themselves and dissatisfied with their professional achievements. There are different tools to measure the burnout syndrome (e.g., De la Fuente et al., 2013) but the most frequently used is the Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1981).

The specialized literature on the topic discusses sociodemographic, vocational, and psychological variables, which precede or co-vary with the burnout syndrome. Important research questions include the relevance of these variables and their relation to the syndrome. This means studying whether they are risk factors or protective factors, or if their partial juxtaposition is conducive to the formulation of models for burnout. However, certain aspects have been analyzed in greater depth than others. Especially worth studying are those variables related to the job itself, which have been previously mentioned as occupational risk factors. The importance of this group of variables is unanimously acknowledged by researchers, but at the same time, these variables are the ones that produce the most contradictory results.

Meta-analysis is a technique to quantitatively synthesize research findings (Sánchez-Meca & Botella, 2010). To our

knowledge, few meta-analyses of burnout variables have ever targeted nursing professionals. The only study that we have been able to find on this topic (Melchior, Bours, Schmitz, & Wittich, 1997) is over 15 years old and is restricted to psychiatric nurses. Consequently, it does not afford sufficient data for an accurate assessment of the work-related factors leading to the development of this disorder in nursing professionals in general. This in itself justifies the need for further research that can provide a better understanding of the contradictory results that have been obtained in previous works. The objective of this research study was to perform a systematic revision and meta-analysis (Fernández-Ríos & Buela-Casal, 2009; Hartley, 2012) of the influence of five occupational factors on the three burnout dimensions, where the MBI has been used to measure burnout, in nursing professionals.

Method

Literature review and inclusion criteria

Various search strategies were used to identify the primary studies (Perestelo-Pérez, 2013). We first searched the following electronic databases: PubMed, Scopus, Proquest, OVID, CINAHL, Psicodoc, Dialnet, and Cochrane. The key words used were "Maslach Burnout Inventory" or "MBI" combined with "nurs*", without any field restrictions. Secondly, references of meta-analytical studies, systematic reviews, and narrative reviews on the topic were consulted. Thirdly, the grey literature was consulted in Google Scholar, Proquest Dissertations and Theses, and TESEO databases. Finally, the Science Citation Index was accessed to find studies that cited the works thus identified. References of the selected research were also retrieved and selected. The literature search was conducted in May 2012, without imposing any time restriction.

The inclusion criteria were the following: (a) empirical nature of the study; (b) use of MBI to measure burnout; (c) sample population of nursing professionals; (d) sufficient statistical information in the study to calculate the effect size between one of the MBI dimensions and at least one of the occupational risk factors. All studies not published in Spanish, English, French, Italian, or Portuguese were excluded. The initial search produced 3,386 studies that were potentially of interest. However, this number decreased to 466 after reading the title and the abstract.

It was then further reduced to 81, after reading the complete text of the papers. Finally, the following number of studies on the relevant variables were identified: 31 on job seniority; 29 on professional experience; 37 on job satisfaction; 4 on specialization; and 6 on work shift. The following reasons were considered to exclude studies from this meta-analysis: (a) the articles did not report separate statistics for the subgroups in the sample; (b) enough data were not provided to calculate an effect size. References included in the meta-analysis are available on request from the corresponding author.

Coding of variables and effect sizes

To examine the variables that can moderate the relation between risk factors and burnout dimensions, we wrote a Manual de Codificación de los Estudios [Coding Manual] (available upon request from the authors) in which certain potentially moderating characteristics were recorded (Cooper, Hedges, & Valentine, 2009). The variables included were the following:

Substantive moderators: age (mean value and standard deviation of the age); sex (percentage of women); marital status (percentage of subjects living with a partner); children (percentage of subjects with children); job seniority (mean value and standard deviation of the length of time that the subjects have been working at their current job); professional experience (mean value and standard deviation of the length of time that the subjects have been working in their profession); job satisfaction (mean value and standard deviation of a job satisfaction measure); specialization (percentage of subjects in critical care units); work shift (percentage of participants on a rotating shift).

Methodological moderators: size sample; Cronbach's alpha coefficient (calculated for each of the MBI dimensions and the job satisfaction questionnaires); MBI scores (mean value and standard deviation of the MBI dimensions); type of MBI (1, Human Services Survey [HSS]; 2, General Survey [GS]; 3, adaptation); language of the MBI (1, English; 2, Spanish; 3, others); response rate (percentage of questionnaires submitted); sampling (1, random; 2, convenience); workplaces (number of centers used to collect data).

Extrinsic moderators: publication type (1, journal with impact factor JCR; 2, journal without impact factor JCR; 3, PhD thesis; 4, other); continent (1, Europe; 2, North America; 3, Asia); date (year when article was published).

The effect size was the Pearson bivariate correlation between each of the burnout dimensions and the following occupational risk factors: professional experience (in years); job seniority (in years); job satisfaction (instruments that measure general job satisfaction); specialization (medical area, critical care area); and work shift (rotation, day, evening).

When the Pearson correlation was not directly obtained, the mean values, standard deviations, t value, sample size, etc. were used to calculate the effect size (Cooper et al., 2009). Three independent judges, not directly involved in the research, were asked to evaluate the reliability of the coding. The mean degree of convergence in the continuous variables was calculated with the intraclass correlation

coefficient, and a value of .87 (minimum = .73; maximum = 1) was obtained. The mean degree of convergence in the categorical variables was calculated with Fleiss's kappa coefficient, thus obtaining a value of .86 (minimum = .76; maximum = 1).

Statistical analysis

To avoid dependency problems, a separate meta-analysis was performed for each response variable. Pearson's correlation was converted to Fisher's z scale to perform meta-analytical calculations in order to stabilize the variances and improve the normality of the distributions. Finally, the z-to-r conversion was performed, and the mean-weighted r-value reported with 95% CIs (Cooper et al., 2009). For each meta-analysis, we calculated the mean effect size as well as 95% confidence intervals, the Q test for heterogeneity, and the I^2 index to evaluate the degree of homogeneity of the mean effect. Once verified that effect sizes were heterogeneous, mean effect sizes and their confidence intervals were calculated assuming a random effects model (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006).

Regression models for quantitative variables were used to analyze the influence of moderating variables. In regards to categorical variables, ANOVAs were used to compare different groups. In all cases, the estimation procedure was weighted least squares (Cooper et al., 2009).

A mixed effects model was adopted for the variables of job seniority, professional experience, and job satisfaction since it was regarded as more realistic than the fixed effects model (Cooper et al., 2009). In contrast, a fixed effects model was adopted for the specialization and work shift variables because of the scarcity of studies detected.

The Egger's linear regression approach was applied to evaluate the potential publication bias when there were at least 17 studies (Card, 2012).

The statistical analyses were performed with the software Comprehensive Meta-analysis 2.0, and R 2.15.2 using metafor package (Viechtbauer, 2010).

Results

Description of effect sizes

Mean correlations between EE and the occupational factors were the following: job seniority, $r = -.007$ (95%CI: $-.064$, $.050$; $k = 31$), professional experience, $r = .011$ (95%CI: $-.045$, $.068$; $k = 29$), job satisfaction, $r = -.482$ (95%CI: $-.514$, $-.449$; $k = 32$), specialization, $r = -.131$ (95%CI: $-.206$, $-.054$; $k = 4$), and work shift, $r = .026$ (95%CI: $-.036$, $.088$; $k = 5$).

In D, mean correlations with the occupational factors were: job seniority, $r = -.014$ (95%CI: $-.067$, $.039$; $k = 22$), professional experience, $r = -.025$ (95%CI: $-.088$, $.039$; $k = 26$), job satisfaction, $r = -.375$ (95%CI: $-.452$, $-.292$; $k = 19$), specialization, $r = -.103$ (95%CI: $-.179$, $-.026$; $k = 4$), and work shift, $r = .010$ (95%CI: $-.050$, $.070$; $k = 6$).

Finally, mean correlations between PA and the occupational factors were: job seniority, $r = -.034$ (95%CI: $-.042$, $.109$; $k = 21$), professional experience, $r = .056$ (95%

Table 1 Simple weighted regression analyses of each continuous moderator variable on the r index for outcomes in Emotional Exhaustion.

Outcome/Moderator variable	<i>k</i>	<i>b</i>	<i>Q_R</i>	<i>Q_E</i>	<i>R²</i>
<i>Job seniority</i>					
Response rate	24	-0.000	5.35*	32.96	.140
Workplaces	20	-0.008	6.51*	30.52*	.176
<i>Professional experience</i>					
Job seniority	6	0.040	4.25*	4.24	.501
Cronbach's alpha for EE	12	-1.681	7.32**	10.89	.402
<i>Job satisfaction</i>					
Age	26	-0.016	10.18**	31.72	.243
Job seniority	5	-0.031	10.38**	7.55	.579
SD job seniority	10	-0.099	32.22***	4.09	.887
Cronbach's alpha for EE	31	-1.070	3.87*	43.53*	.082
Cronbach's alpha for job satisfaction	25	-1.100	6.09*	34.31	.151
<i>Specialization</i>					
Age	3	0.025	4.79*	0.77	.845
Sex	3	-0.016	5.54*	0.02	.995
Cronbach's alpha for EE	3	15.710	10.37**	10.04**	.508
Workplaces	4	0.054	5.81*	11.60**	.260
Date	4	-0.022	10.30**	12.04**	.461
<i>Work shift</i>					
Sex	3	-0.013	9.65**	3.97*	.709
Size	5	-0.001	7.62**	20.73***	.269
Workplaces	5	0.052	10.84***	17.50***	.382
Date	5	-0.013	5.18*	23.17***	.183

Note. *k*: number of studies; *b*: unstandardized regression coefficient; *Q_R*: statistical test of between group effects; *Q_E*: statistical test of homogeneity of the effect size within each group.

*: *p* < .05, **: *p* < .01, ***: *p* < .001.

CI: -.007, .119; *k* = 22), job satisfaction, *r* = .152 (95%CI: .012, .286; *k* = 16), specialization, *r* = .096 (95%CI: .019, .172; *k* = 4), and work shift, *r* = .035 (95%CI: -.016, .086; *k* = 6).

Following the classification in Cohen (1988), in the area of job satisfaction, the correlations obtained were fairly high and significant for EE and D, whereas they were low and significant for PA. Regarding job seniority, professional experience, and work shift, the mean correlations were low and not significant for the three MBI dimensions. However, in the case of specialization, the mean correlations were low but significant for the three dimensions. Nevertheless, the effect sizes of the primary studies were not always low in the variables of job seniority, professional experience, and work shift. Significant high and moderate correlations – in some cases, positive and in others, negative – were obtained for the three dimensions. This partially explains the low mean effect sizes obtained for these variables.

Publication bias was statistically tested. Egger regression test showed no evidence of publication bias with the exception of the relationship between job satisfaction and D (*p* = .007). On the other hand, the grey literature was included in our meta-analysis (e. g., unpublished dissertations). Therefore, these results indicated that publication bias was unlikely to affect our findings.

The heterogeneity analysis showed that there was great variability in all the estimates of the mean effect size. The *Q* was significant in each of the meta-analyses considered and the *I²* indicated that at least 75% of the variability in the mean effect sizes was due to factors between studies. This result along with the dispersion of the effect sizes of the primary studies meant that the next step was to find moderating variables that could explain this heterogeneity.

Analysis of moderating variables

In regards to the correlation between EE and job seniority, none of the substantive moderators analyzed were significant. In contrast, the following methodological moderators were found to be significant: type of MBI (*p* = .009); language of the MBI (*p* = .002); response rate (*p* = .021); and number of workplaces (*p* = .011). Of the extrinsic moderators, only continent was significant (*p* < .001) (Tables 1 and 2).

In regards to the correlation between EE and professional experience, job seniority was the only significant substantive moderator (*p* = .039). Significant methodological moderators were Cronbach's alpha of EE (*p* = .007) and type of MBI (*p* = .041). However, none of the extrinsic moderators were found to be significant.

Table 2 Results of comparing different qualitative moderator variables on the effect size for outcomes in Emotional Exhaustion.

Outcome/Moderator variable	k	r	95%CI	ANOVA results	ω^2
Job seniority					
Type of MBI					
HSS	21	-.063	[-.128, .003]	$Q_B(2) = 9.47^{**}$	.000
GS	1	-.019	[-.088, .050]	$Q_w(28) = 177.28^{***}$	
Adaptation	9	.122	[.024, .219]		
Language of the MBI				$Q_B(2) = 12.81^{**}$	.000
English	22	-.061	[-.122, .002]	$Q_w(28) = 171.39^{***}$	
Spanish	4	.258	[.085, .415]		
Others	5	.049	[-.056, .153]		
Continent				$Q_B(2) = 22.54^{***}$	.087
Europe	17	.045	[-.025, .116]	$Q_w(28) = 144.65^{***}$	
North America	12	-.045	[-.125, .035]		
Asia	2	-.200	[-.271, -.127]		
Professional experience					
Type of MBI				$Q_B(2) = 6.41^{*}$	.000
HSS	15	-.052	[-.138, .035]	$Q_w(26) = 153.19^{***}$	
GS	2	-.044	[-.142, .056]		
Adaptation	12	.097	[.005, .187]		
Job satisfaction					
Type of MBI				$Q_B(2) = 20.18^{***}$	.001
HSS	14	-.562	[-.603, -.519]	$Q_w(33) = 174.87^{***}$	
GS	3	-.472	[-.557, -.378]		
Adaptation	20	-.426	[-.466, -.384]		
Language of the MBI				$Q_B(2) = 16.88^{***}$	.025
English	17	-.547	[-.595, -.496]	$Q_w(34) = 195.85^{***}$	
Spanish	3	-.425	[-.501, -.341]		
Others	17	-.422	[-.391, -.391]		
Continent				$Q_B(3) = 20.01^{***}$	.035
Europe	17	-.424	[-.454, -.394]	$Q_w(34) = 214.66^{***}$	
North America	15	-.538	[-.576, -.498]		
Asia	5	-.509	[-.674, -.294]		
Specialization					
Type of MBI				$Q_B(1) = 9.04^{**}$	.082
HSS	1	.097	[-.071, .259]	$Q_w(2) = 13.30^{**}$	
GS	3	-.191	[-.274, -.106]		
Adaptation					
Language of the MBI				$Q_B(2) = 12.30^{**}$	.000
English	1	.097	[-.071, .259]	$Q_w(1) = 10.04^{**}$	
Spanish	1	.084	[-.226, .378]		
Others	2	-.214	[-.299, -.125]		
Continent				$Q_B(2) = 13.65^{**}$	.000
Europe	2	-.318	[-.447, -.117]	$Q_w(1) = 8.69^{**}$	
North America	1	.097	[-.071, .259]		
Asia	1	-.125	[-.229, -.018]		
Publication type				$Q_B(2) = 12.30^{**}$	.000
JCR	2	-.214	[-.299, -.125]	$Q_w(1) = 10.04^{**}$	
vNo JCR	1	.084	[-.226, .378]		
Other document	1	.097	[-.071, .259]		
Work shift					
Sampling				$Q_B(1) = 23.55^{***}$	.230
Random	2	.196	[.105, .284]	$Q_w(3) = 4.80$	
Convenience	3	-.112	[-.194, -.029]		

Note. k: number of studies; r: mean effect size; Q_B : between-categories Q statistic; Q_w : within-categories Q statistic.

*: $p < .05$, **: $p < .01$, ***: $p < .001$.

Table 3 Simple weighted regression analyses of each continuous moderator variable on the r index for outcomes Depersonalisation.

Outcome/Moderator variable	<i>k</i>	<i>b</i>	<i>Q_R</i>	<i>Q_E</i>	<i>R²</i>
<i>Job seniority</i>					
SD age	12	-0.065	15.65***	9.39	.625
<i>Professional experience</i>					
Sex	22	-0.004	5.32*	30.43	.149
Children	3	0.009	5.28*	0.38	.935
SD job seniority	3	0.198	8.69**	0.02	.998
SD professional experience	13	-0.038	4.32*	17.92	.194
<i>Job satisfaction</i>					
Job seniority	5	-0.048	6.26*	2.87	.686
Size	19	-0.000	4.88*	18.11	.212
Cronbach's alpha for D	17	-0.990	18.73***	17.03	.524
<i>Specialization</i>					
Cronbach's alpha for D	3	3.123	18.16***	6.48*	.737
<i>Work shift</i>					
Age	3	0.023	27.39***	2.88	.904
Sex	4	-0.019	25.32***	6.41*	.792
Size	6	-0.001	37.41***	23.42***	.615
Response rate	5	-0.007	6.98**	33.49***	.172
SD D	4	0.143	13.08***	18.89***	.409
Workplaces	6	0.044	7.83**	53.01***	.129

Note. *k*: number of studies; *b*: unstandardized regression coefficient; *Q_R*: statistical test of between group effects; *Q_E*: statistical test of homogeneity of the effect size within each group.

*: *p* < .05, **: *p* < .01, ***: *p* < .001.

Regarding the correlation between EE and job satisfaction, significant substantive moderators were: mean age (*p* = .001); job seniority (*p* = .001); and the SD of job seniority (*p* < .001). Significant methodological moderators were: Cronbach's alpha of EE (*p* = .049); Cronbach's alpha of job satisfaction (*p* = .014); type of MBI (*p* < .001), and language of the MBI (*p* < .001). The only significant extrinsic moderator was the continent where the study had been performed (*p* < .001).

In the correlation between EE and job specialization, the significant substantive moderators were mean age (*p* = .029) and sex (*p* = .019). Significant methodological moderators were: Cronbach's alpha of EE (*p* = .001); type of MBI (*p* = .003); language of the MBI (*p* = .002); and number of workplaces (*p* = .016). All of the extrinsic moderators were found to be statistically significant: date of publication (*p* = .001); continent (*p* = .001); and type of publication (*p* = .002).

In the correlation between EE and work shift, the only significant moderator was sex (*p* = .002). The significant methodological moderators were the following: sample size (*p* < .006); sampling technique (*p* < .001); and number of workplaces (*p* < .001). The only significant extrinsic moderators were date of publication (*p* = .023).

Regarding the correlation between D and job seniority, the only significant substantive moderator was the SD of age (*p* < .001). None of the other substantive, methodological, or extrinsic moderators was found to be significant (Tables 3 and 4).

Significant substantive moderators for the correlation between D and professional experience were the following: sex (*p* = .021); number of children (*p* = .022); SD of job seniority (*p* = .003); and the SD of professional experience (*p* = .038). The only significant methodological moderator was the language of the MBI (*p* = .001)

For the correlation between D and job satisfaction, the only significant substantive moderator was job seniority (*p* = .012). Significant methodological moderators were the following: sample size (*p* = .027); Cronbach's alpha of D (*p* < .001); type of MBI (*p* < .001); and the language of the MBI (*p* < .001). The only significant extrinsic moderator was continent (*p* < .001).

For the correlation between D and specialization, no substantive moderator was found to be significant. Significant methodological moderators were Cronbach's alpha of D (*p* < .001) and the language of the MBI (*p* = .047). Significant extrinsic moderators were continent (*p* = .001) and type of publication (*p* = .047).

Regarding the correlation between D and work shift, two substantive moderators were found to be significant: mean age (*p* < .001) and sex (*p* < .001). Significant methodological moderators were the following: sample size (*p* < .001); SD of the scores in D (*p* < .001); type of MBI (*p* = .010); language of the MBI (*p* < .001); response rate (*p* = .008); sampling technique (*p* < .001); and the number of workplaces (*p* = .005). The only two statistically significant extrinsic moderators were continent (*p* < .001) and type of publication (*p* < .001).

Table 4 Results of comparing different qualitative moderator variables on the effect size for outcomes in Depersonalisation.

Outcome/Moderator variable	<i>k</i>	<i>r</i>	95% C. I.	ANOVA results	ω^2
Professional experience					
<i>Language of the MBI</i>					
English	15	-.007	[-.146, -.008]	$Q_B(2) = 13.44^{**}$	.000
Spanish	2	.166	[.055, .273]	$Q_w(23) = 180.52^{**}$	
Others	9	.034	[-.104, .172]		
Job satisfaction					
<i>Type of MBI</i>					
HSS	4	-.453	[-.595, -.283]	$Q_B(2) = 103.27^{**}$	.511
GS	3	-.577	[-.595, -.558]	$Q_w(16) = 75.72^{**}$	
Adaptation	12	-.283	[-.343, -.222]		
<i>Language of the MBI</i>					
English	7	-.511	[-.577, -.438]	$Q_B(2) = 27.65^{**}$	.109
Spanish	3	-.224	[-.306, -.138]	$Q_w(16) = 102.07^{**}$	
Others	9	-.305	[-.374, -.232]		
<i>Continent</i>					
Europe	8	-.267	[-.347, -.182]	$Q_B(2) = 19.72^{**}$	.039
North America	8	-.497	[-.563, -.424]	$Q_w(16) = 114.04^{**}$	
Asia	3	-.300	[-.385, -.209]		
Specialization					
<i>Language of the MBI</i>					
English	1	.018	[-.149, .184]	$Q_B(2) = 6.12^*$	.000
Spanish	1	.153	[-.158, .437]	$Q_w(1) = 21.28^{**}$	
Others	2	-.159	[-.247, -.070]		
<i>Continent</i>					
Europe	2	-.339	[-.466, -.199]	$Q_B(2) = 14.31^{**}$	.000
North America	1	.018	[-.149, .184]	$Q_w(1) = 13.09^{**}$	
Asia	1	-.028	[-.134, .079]		
<i>Publication type</i>					
JCR	2	-.159	[-.247, -.070]	$Q_B(2) = 6.12^*$	.000
No JCR	1	.153	[-.158, .437]	$Q_w(1) = 21.28^{**}$	
Other document	1	.018	[-.149, .184]		
Work shift					
<i>Sampling</i>					
Random	2	.141	[.049, .232]	$Q_B(1) = 13.03^{**}$	.015
Convenience	4	-.082	[-.158, -.004]	$Q_w(4) = 47.81^{**}$	
<i>Type of MBI</i>					
HSS	2	.225	[.053, .385]	$Q_B(1) = 6.70^*$	.000
GS	4	-.019	[-.082, .045]	$Q_w(4) = 54.14^{**}$	
Adaptation					
<i>Language of the MBI</i>					
English	2	.225	[.053, .385]	$Q_B(2) = 22.40^{**}$	.001
Spanish	2	.235	[.097, .364]	$Q_w(3) = 38.44^{**}$	
Others	2	-.083	[-.153, -.012]		
<i>Continent</i>					
Europe	2	.325	[.097, .364]	$Q_B(2) = 22.40^{**}$	.000
North America	2	.225	[.053, .385]	$Q_w(34) = 38.44^{**}$	
Asia	2	-.083	[-.153, -.012]		
<i>Publication type</i>					
JCR	2	-.083	[-.153, -.012]	$Q_B(2) = 27.16^{**}$	.065
No JCR	3	.308	[.182, .423]	$Q_w(3) = 33.68^{**}$	
Other document	1	.050	[-.149, .245]		

Note. *k*: number of studies; *r*: mean effect size; Q_B : between-categories *Q* statistic; Q_w : within-categories *Q* statistic.

*: $p < .05$, **: $p < .01$, ***: $p < .001$.

Table 5 Simple weighted regression analyses of each continuous moderator variable on the r index for outcomes in Personal Accomplishment.

Outcome/Moderator variable	<i>k</i>	<i>b</i>	<i>Q_R</i>	<i>Q_E</i>	<i>R²</i>
<i>Job seniority</i>					
Children	4	-0.014	5.37**	3.70	.592
Cronbach's alpha for PA	6	7.32	61.38***	61.04***	.501
<i>Professional experience</i>					
SD PA	17	0.023	5.32*	21.87	.196
<i>Job satisfaction</i>					
SD PA	14	0.043	5.99*	13.99	.300
<i>Specialization</i>					
Age	3	0.033	7.99**	0.47	.944
Sex	3	-0.017	6.11*	2.34	.722
Size	4	-0.001	8.97**	7.46*	.546
Response rate	4	-0.015	8.97**	7.46*	.546
Workplaces	4	0.049	4.83*	11.60**	.294
<i>Work shift</i>					
Age	3	-0.012	15.22***	6.52***	.700
SD age	3	-0.075	19.34***	2.41	.890
Sex	4	0.011	8.24**	13.94***	.372
Marital status	4	-0.031	19.81***	10.76**	.648
Children	3	-0.012	13.16***	10.21**	.563
Job seniority	3	0.097	9.56**	0.89	.915
Professional experience	3	0.047	10.44**	0.05	.995
Size	6	0.001	19.72***	20.96***	.484
Response rate	5	0.007	26.28***	4.34	.858

Note. *k*: number of studies; *b*: unstandardized regression coefficient; *Q_R*: statistical test of between group effects; *Q_E*: statistical test of homogeneity of the effect size within each group.

*: *p* < .05, **: *p* < .01, ***: *p* < .001.

For the correlation between PA and job seniority, the only significant substantive moderator was number of children (*p* = .020). There was also only one significant methodological moderator: Cronbach's alpha of PA (*p* < .001). None of the extrinsic moderators was found to be significant (Tables 5 and 6).

Regarding the correlation between PA and professional experience, there were no statistically significant substantive moderators. The two significant methodological moderators were mean PA scores (*p* = .023) and the SD of the PA scores (*p* = .021).

In reference to the correlation between PA and job satisfaction, there were no substantive moderators that were statistically significant. In contrast, the two significant methodological moderators were the mean PA scores (*p* < .001) and the SD of the PA scores (*p* = .014). No extrinsic moderator was found to be statistically significant.

For the correlation between PA and specialization, the two significant substantive moderators were mean age (*p* = .005) and sex (*p* = .013). Significant methodological moderators were the following: sample size (*p* = .003); type of MBI (*p* = .039); response rate (*p* = .003); and number of workplaces (*p* = .028). The only significant extrinsic moderator was continent (*p* = .003).

In regards to the correlation between PA and work shift, the following substantive moderators were statistically

significant: mean age (*p* < .001); SD of age (*p* < .001); sex (*p* = .004); marital status (*p* < .001); number of children (*p* < .001); job seniority (*p* = .002); and professional experience (*p* = .001). The methodological moderators found to be significant were: sample size (*p* < .001); mean PA (*p* < .001); type of MBI (*p* < .001); language of MBI (*p* < .001); response rate (*p* < .001); and sampling technique (*p* = .047). Continent was the only significant extrinsic moderator (*p* < .001).

Finally multiple regression models were used to obtain explanatory models of effect size variation in those relations between some of the burnout dimensions and the moderating variables that were statistically significant in the previous analysis (Sánchez-Meca & Botella, 2010). This analysis was performed only in those cases where the number of studies was sufficient to permit the application of statistical techniques.

A regression model was thus obtained that predicted the variability of size effects in the relation between EE and job seniority. In this case, the predictor variables were response rate, number of workplaces, and the type of MBI used in the studies. The model was found to be significant [*Q_M*(4) = 9.97, *p* = .041] since it explained 14.1% of the variance.

In the relation between EE and professional experience, a model was obtained with Cronbach's alpha and type of

Table 6 Results of comparing different qualitative moderator variables on the effect size for outcomes in Personal Accomplishment.

Outcome/Moderator variable	k	r	95% CI	ANOVA results	ω^2
Specialization					
Type of MBI					
HSS	1	.248	[.085, .398]	$Q_B(1) = 4.26^*$	.000
Adaptation	3	.054	[-.034, .140]	$Q_w(2) = 12.17^{**}$	
Continent				$Q_B(2) = 11.98^{**}$	.149
Europe	2	.225	[.078, .364]	$Q_w(1) = 4.43^*$	
North America	1	.248	[.085, .398]		
Asia	1	-.034	[-.140, .073]		
Work shift					
Sampling				$Q_B(1) = 3.93^*$	.000
Random	3	-.004	[-.067, .060]	$Q_w(4) = 36.75^{***}$	
Convenience	3	.102	[.019, .185]		
Type of MBI				$Q_B(1) = 30.64^{***}$	.651
HSS	3	-.131	[.091, -.054]	$Q_w(4) = 10.04^*$	
Adaptation	3	.157	[-.207, .221]		
Language of the MBI				$Q_B(2) = 31.26^{***}$	.570
English	3	-.131	[-.207, -.054]	$Q_w(3) = 9.42^*$	
Spanish	1	.087	[-.100, .268]		
Others	2	.166	[.096, .235]		
Continent				$Q_B(2) = 26.92^{***}$	.392
Europe	2	-.105	[-.182, -.027]	$Q_w(3) = 13.76^{**}$	
North America	2	-.070	[-.242, .106]		
Asia	2	.166	[.096, .235]		

Note. k: number of studies; r: mean effect size; Q_B : between-categories Q statistic; Q_w : within-categories Q statistic.

*: $p < .05$, **: $p < .01$, ***: $p < .001$.

MBI as predictor variables. It was considered significant [$Q_M(3) = 8.09, p = .044$] with an associated explanation of 23% of the effect size variance. The predictive model of the relation between EE and job satisfaction included the following predictor variables of size effect variability: age, Cronbach's alpha of emotional exhaustion, Cronbach's alpha of job satisfaction, type of MBI, and questionnaire language. This model was found to be significant [$Q_M(7) = 31.89, p < .001$] since it explained 63.8% of the variance.

A single predictive model was obtained of the variability of effect sizes in the relation between D and job satisfaction. In this case, the predictor variables were sample size, Cronbach's alpha of depersonalization, and type of MBI. This model was significant, [$Q_M(4) = 51.82, p < .001$], explaining 53.1% of the variance.

Discussion

The results showed that there was a high and significant correlation between burnout and job satisfaction, whereas the correlation was somewhat lower between burnout and specialization. The correlations between job satisfaction and the dimensions of EE and D were moderate and significant. This means that lower levels of job satisfaction led to correspondingly higher levels of EE and D on the part

of the workers. The correlation with PA was somewhat lower but still significant. Thus, when workers were satisfied with their job, they felt more professionally fulfilled. The magnitude of the correlations is in consonance with those obtained in other previously reviewed work (Blegen, 1993; Melchior et al., 1997; Prins et al., 2007; Zangaro & Soeken, 2007).

The correlations between the three MBI dimensions and specialization were low but significant. Accordingly, those health professionals that worked in a surgical service (e.g., intensive care or emergencies) felt more tired, depersonalized, and less personally fulfilled than staff working in other areas. Similar results were obtained in some of the works reviewed by Navarro (2012). This could be due to the fact that nurses in surgical wards are generally in closer contact with patients. They are thus subject to more complex demands and can even find themselves involved in morally conflictive situations (Epp, 2012).

The correlations between the MBI dimensions and the other variables were not significant. This coincides with the results of other works focusing on health professionals in general (Leiter & Harvie, 1996; Paris & Hoge, 2010). However, this could be due to the coexistence in the same meta-analysis of studies with high positive correlations along with others that show high negative correlations. The high level of heterogeneity in the effect sizes of the studies

indicated that there were various factors causing this variability.

Various substantive moderators were found to be significant in the three MBI dimensions. In EE, the mean age moderated the correlation with job satisfaction and specialization. Therefore, when the mean age of the sample was low, there was a higher correlation with job satisfaction and a lower correlation with specialization. Sex was also a variable influencing the correlation with specialization and work shift, given that when the sample had a higher percentage of females, the correlation was higher. Job seniority also affected the correlation with professional experience and job satisfaction. Accordingly, when job seniority was high, the correlation with professional experience was higher and the correlation with job satisfaction was lower. Furthermore, the correlation with job satisfaction decreased as the SD of job seniority increased.

In D, the mean age of the sample moderated the correlation with work shift, which became higher when the respondents were older. The SD of the age of the sample moderated the correlation with job seniority. This meant that the lower the dispersion, the greater the correlation. Sex moderated the correlation with professional experience and work shift, which decreased with increased percentage of females in the sample. The number of children also moderated the correlation with professional experience, which became higher as the number of children increased. Job seniority influenced the correlation with job satisfaction since the correlation was higher when there was a lower level of seniority. The dispersion of job seniority as well as of professional experience moderated the correlation with professional experience. However in the case of job seniority, the relation was strengthened by a higher degree of professional experience, whereas in the case of professional experience, the opposite occurred.

In PA, the mean age of the sample moderated the correlation with specialization and work shift, such that a younger age corresponded to a lower correlation with specialization and a higher correlation with work shift. The SD of the sample age also influenced the correlation with work shift, which increased as the dispersion decreased. Sex was another factor that influenced the correlation with specialization and work shift. Accordingly, when there were a higher percentage of females, the correlation with specialization was lower and the correlation with work shift was higher. The number of children moderated the correlation with job seniority and work shift. In both cases the correlations became lower as the number of children increased. Marital status also influenced the correlation with work shift, which increased when the percentage of workers in a relationship was higher. Moreover, job seniority and professional experience moderated the correlation with work shift, which increased with the number of years of professional experience.

According to these results, temporal factors such as age or job seniority had an impact on the relation between job satisfaction and the burnout dimensions of EE and D. Consequently, job satisfaction may be less relevant in the initial years of a worker's professional life than in later years. The role of a worker's sex in depersonalization has

also been frequently debated (Leiter & Harvie, 1996; Ortega & López, 2004; Prins et al., 2007). In the case of nursing professionals, it appears that women are less susceptible than men to depersonalization as a result of job seniority.

The number of children seems to have an influence on the relation between job seniority and depersonalization along with reduced personal accomplishment. In fact this is the least important variable in the development of the burnout syndrome when the number of children is low.

There were various significant methodological moderators that explained the heterogeneity of the effect sizes between the three MBI dimensions and the five variables considered. Regarding the type of MBI, job seniority, professional experience, and job satisfaction, the adaptations of the MBI obtained lower mean correlations (closer to zero) than those obtained in the original tests. However, precisely the opposite occurred in the case of specialization and work shift.

Regarding the language of the inventory, the effect sizes seem to be clustered differently, according to dimension and variable. For example, for specialization, the inventories in Spanish and English tended to obtain positive correlations whereas those in other languages tended to obtain negative ones. A pattern was also observed in the sampling technique, since in the correlations between work shift and the dimensions of emotional exhaustion and depersonalization, positive correlations tended to cluster together in studies that used random sampling. Another variable that was often significant and explained the variability of the correlations was the reliability of the instruments. These results agree with those obtained in other meta-analyses (e.g., Aguayo, Vargas, De la Fuente, & Lozano, 2011), where the reliability of the MBI varied, depending on these moderators.

Of the extrinsic moderators, the continent where the study was performed was significant in the explanation of the heterogeneity found in the effect sizes in the three dimensions. The clustering pattern of the mean effect sizes had a different intensity, depending on the variable considered in each case. These results could be due to cultural differences (Prins et al., 2007; Zangaro & Soeken, 2007).

The results obtained with the methodological and extrinsic moderating variables indicate that the research results should be interpreted with caution since the correlation sign between burnout dimensions and certain variables (i.e. job seniority and professional experience) can vary, depending on the type of MBI (original or adaptation), the language of publication, and the country where the study was carried out. It is also important for the research to be performed with methodological rigor since the size or representativeness of the sample, response rate, and reliability of the instruments used can affect the effect sizes.

Some limitations should be considered when interpreting the findings obtained in the current study. First, there were not always enough studies to apply random-effects (and mixed-effects) models that would allow more appropriate conclusions. Second, results of moderator analyses for the specialization and the work shift factors should be taken with caution because the number of studies was small. However, we included the later results to understand the

heterogeneity found in these factors and to highlight the recommendation of keeping the literature on these topics updated for future meta-analysis.

In summary, the results obtained in this work reflect a clear association between burnout and job satisfaction. The conclusion is that job satisfaction may be a high protective factor in the burnout syndrome. Nevertheless, this relation should be qualified by the previously cited moderating variables in clinics, health centers, and applied settings. Similarly, the development of this syndrome seems to be directly linked to the specialization or service where the nursing professional works. Depending on the specialization, this connection is more or less accentuated. In contrast, within the set of risk factors that intervene in the development of the burnout syndrome, job seniority and professional experience are not so relevant despite the fact that this can vary, depending on personal and contextual characteristics.

Certain methodological variables were found to clearly influence the associations between the dimensions of the burnout syndrome and related workplace variables. It is crucial for health professionals as well as researchers in the field to be aware of this influence. Accordingly, the sampling technique, the MBI version used (original test or adaptation) and especially the reliability of the measuring instruments are all aspects that explain and clarify most of the contradictory results obtained in previous research on this topic.

Funding

Excellence Research Projects P07HUM-02529 and P11HUM-7771 (Junta de Andalucía-Spain).

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